BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

IN THE MATTER OF:	)	
	)	
PROPOSED SITE-SPECIFIC WATER POLLUTION REGULATIONS APPLICABLE TO THE CITY OF GALVA	)	R___

CITY OF GALVA'S PETITION
FOR SITE-SPECIFIC REGULATION

NOW COMES the City of Galva ("Galva"), by and through its attorneys Brown, Hay & Stephens, LLP, and pursuant to 415 ILCS 5/27(a), 35 Ill. Admin. Code 102.208, and 35 Ill. Admin Code 102.210, hereby petitions the Illinois Pollution Control Board ("Board") for a site-specific effluent regulation concerning boron. In support of such Petition Galva offers the following.

I. BACKGROUND

Galva is seeking a site-specific effluent limit for boron for discharges from Galva's two sewage treatment plants: The first of Galva's sewage treatment plants, the Northeast Sewage Treatment Plant ("Northeast STP"), is an activated sludge plant that ultimately discharges into an unnamed tributary of the South Branch of the Edwards River; the second of Galva's sewage treatment plants, the Southwest Sewage Treatment Plant ("Southwest STP") is an aerated lagoon system, discharging into Mud Creek, a tributary of Walnut Creek, which is a tributary of the Spoon River.

The NPDES Permit covering the Southwest STP, NPDES Permit No. IL0023647, requires sampling and separating for boron with a concentration limit of 1.0 mg/L in the effluent. See Exhibit A. Although there is no effluent standard for boron, the Illinois Environmental

Protection Agency (IEPA) required such condition based upon its interpretation of Section 304.105 of the Board's rules, which prohibits discharges which would violate applicable water quality standards. The General Use numeric water quality standard for boron, established by the Board in 1972, is 1.0 mg/l. See NPDES Permit No. IL0023647, Exhibit A. The Illinois Environmental Protection Agency (IEPA) required, as a condition of Galva's NPDES permit, that it be compliant with a 1.0 mg/L effluent limitation for boron by September 2007. [1]

Through the Board's site specific rulemaking procedure, Galva seeks a Site Specific standard applicable to its boron effluent discharge, if such adjustment is in fact necessary, in the context of these circumstances. This petition establishes that it is neither technically nor economically feasible to require Galva to establish a boron water quality of 1.0 mg/L for waters being discharged from the Northeast STP and the Southwest STP. The substance of this petition will demonstrate that the costs of any alternatives far exceed any benefit to the environment; more specifically, the petition establishes that compliance with the boron standard in this context is both unnecessary to the protection of the environment and inherently impractical.

As further demonstrated in this petition, the boron levels in the proposed site-specific effluent standard do not harm aquatic life, human health, or the environment generally. In addition, the Board's adoption of the proposed site-specific standard will produce an economically beneficial solution, instead of passing on the high, unnecessary costs of treatment or obtaining a new water source to the citizens of Galva.

II. PROPOSED SITE SPECIFIC RULE

As proposed by this petition, the site-specific effluent standard would state as follows:

[1] Pending before the IEPA is an application for permit amendment which would extend this deadline until such time as the IPCB acts on this rulemaking.

Section 304.2xx City of Galva Treatment Plant Discharge This must change

This section applies to the discharge from the Northeast Sewage Treatment Plant located at 523 NE 9th Street in Galva, Illinois, owned by the City of Galva, to an unnamed tributary of the South Branch of the Edwards River, said point being located in Henry County, occupying portions of Sections 21, 26, 27, 28, 33, 34, and 35 in Township 14 North, Range 4 East of the Fourth Principal Meridian. This section also applies to the discharge from the Southwest Sewage Treatment Plant located ½ mile South of BNSF RR and SW 4th Street in Galva, Illinois, owned by the City of Galva, to Mud Creek, a tributary of Walnut Creek, which is a tributary of the Spoon River, said point being located in Henry County, occupying portions of Sections 21, 26, 27, 28, 33, 34, and 35 in Township 14 North, Range 4 East of the Fourth Principal Meridian. Such discharges shall not be subject to Section 304.105 as it applies to the water quality standard for boron at 35 Ill. Admin. Code 302.208(e). Such discharges must meet a boron effluent standard of a maximum of 3.0 mg/L, with an average discharge of 1.13 mg/L.

III. STATEMENT OF REASONS

A. Existing Conditions

Galva is a rural community, with a population of 2,758, located in south central Henry County. Galva occupies portions of Sections 21, 26, 27, 28, 33, 34 and 35 in Township 14 North, Range 4 East of the Fourth Principal Meridian, Henry County, Illinois. See *Map of Galva*, Exhibit B. Galva owns and operates both a sewage treatment system and a potable water distribution system.

Galva's water supply system draws from a deep aquifer system, obtaining its potable water from two wells, Well No. 4 and Well No. 5. A map of Galva, indicating the locations of Well No. 4 and Well No. 5, is attached hereto and incorporated herein as Exhibit B. Well No. 4 is located near the southwest corner of North East 2nd Street and Center Avenue in Galva. Well No. 5 is located on the south side of U.S. Route 34, near Galva's Maintenance Building, in Galva.

Well No. 4 was drilled in 1933 to a depth of 1,686 feet, above the Shakopee Dolomite Formation. Well No. 4's pump sits 450 feet below ground level, is driven by a 100 horsepower motor, and has a nominal pumping capacity of 550 gallons per minute (gpm). Well No. 4

discharges water into a forced draft aerator, sitting 20 feet below ground level, mounted on top of a 43,000 gallon steel ground storage tank, with a capacity of 600 gpm.

Well No. 5 was drilled in 1988 to a depth of 1,770 feet, above the Shakopee Dolomite Formation. Well No. 5's pump sits 540 feet below ground level, is driven by a 125 horsepower motor, and has a rated pumping capacity of 600 gpm. Well No. 5 discharges water into a forced draft acrator, which is mounted on top of a 20,000 gallon ground storage tank.

Together, Well No. 4 and Well No. 5 pump an average of 400,000 gallons of water per day for the residents of Galva. The two wells are located approximately ¾ of a mile from each other, but work in tandem through a series of interconnecting 6" and 8" water mains.

B. Boron standards

Boron is a naturally occurring element, which is inherent in Galva's Municipal Water Supply. Boron is an element which derives originally from compounds called borates. Borates are found in the oceans, sedimentary rocks, coal, shale, and some soils. Borates are naturally released into the environment from the oceans, volcanic activity and other geothermal releases such as geothermal steam, and weathering of clay-rich sedimentary rocks. While boron can also result from human activity, the boron problem in Galva is not caused by any human or external environmental influence; it is rather a naturally occurring element in Galva's water supply.

Boron is an essential micronutrient for plants, with levels of boron required for optimum growth depending on the plant species. In some plants there is a narrow range between boron deficiency and toxicity. There are two regulatory standards for boron contained in Board rules: the water quality standard at issue here, found at 35 Ill. Adm. Code 302.208(e) (1 mg/L) and a Class II and III groundwater standard (2 mg/L). See 35 Ill. Adm. Code 620.410(a) and 620.420(a)(1)

Humans are primarily exposed to boron through food and drinking water. Neither the federal Safe Drinking Water Act nor IPCB regulations (which adopt the federal drinking water parameters as identical-in-substance rules) contain a numeric potable water standard for boron. Canadian guidelines, developed by Health Canada[2] in 1990, have set the Interim Maximum Acceptable Concentration (IMAC) for boron in drinking water at 5 mg/l.

C. **The Discharge**

Galva's Municipal Water Supply ultimately feeds directly into Galva's two sewage treatment plants. As a result, the excess boron levels discovered in the treatment plants have been traced directly back to the naturally occurring boron in Galva's water supply. While Galva's water supply does not exceed any relevant potable drinking water standard, and is generally considered safe for consumption, it nonetheless is the source of the boron concentration in Galva's sanitary system discharge.[3]

The IEPA has set the relevant NPDES permit limitation for boron in the sanitary discharge at 1 mg/l. This standard is both five times more stringent than the Canadian drinking water guideline for boron, and is identical to the Board's boron water quality standard found at 35 Ill. Adm. Code 302.208(e), which the Board established in 1972. Although the limitation is based upon the numeric water quality standard, the IEPA applies this standard as an effluent standard in the Galva permit since there are no applicable receiving waters that are capable of mixing. See discussion below at pages 6 through 10.

[2] Health Canada develops and enforces regulations under Government of Canada legislation. The Department consults with the Canadian public, industry and other interested parties in the development of laws that protect health and safety. See http://www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/doc_sup-appui/boron-bore/index_e.html

[3] Drinking water from the Galva Municipal Water Supply contains slightly over 1 mg/L; it meets all relevant state and federal standards, and would meet the Canadian standard as well.

The Southwest STP is an aerated lagoon system sewage treatment plant, discharging into Mud Creek, a tributary of Walnut Creek, which is a tributary of the Spoon River. The Southwest STP treats a design average flow of 0.3 MGD and a design maximum flow of 1.0 MGD. A schematic of the Southwest STP is attached hereto and incorporated herein as Exhibit C. Effluent from the Southwest STP travels approximately 7.0 miles downstream to Walnut Creek, then discharges into the Spoon River approximately 31.7 miles downstream. A chart of discharge flows from the Southwest STP is attached hereto and incorporated herein as Exhibit D.

The Northeast STP is an activated sludge plant that discharges into an unnamed tributary of the South Branch of the Edwards River, located in the Mississippi Central River Watershed. The Northeast STP treats a design average flow of 0.385 MGD and a design maximum flow of 0.867 MGD. A schematic of the Northeast STP is attached hereto and incorporated herein as Exhibit E. Effluent from the Northeast STP travels approximately 1.1 miles downstream in the tributary to the South Branch of the Edwards River. At this point, any effluent flow would travel approximately another 15.0 miles downstream to meet with the Edwards River. A chart of discharge flows from the Northeast STP is attached hereto and incorporated herein as Exhibit D.

D. Current Applicable Regulations and Permit Terms

All discharges emitted from the Southwest STP are covered by NPDES Permit No.IL0023647. See Exhibit A. NPDES Permit No.IL0023647 requires sampling and reporting for boron with a limit of 1.0 mg/L, and became effective July 1, 2004. NPDES Permit No.IL0023647 was amended, effective August 4, 2004, to include the compliance schedule for the boron effluent.

The 1.0 mg/L boron effluent limitation in the NPDES Permit is based upon, and equivalent to, the Illinois General Use water quality standard for boron set forth in 35 Ill. Admin.

Code 302.208(e). The standard was promulgated in 1972 to implement the requirements of the Federal Water Pollution Control Act Amendments of 1972, the precursor to the Clean Water Act. 33 U.S.C. 1251 et seq. The water quality standard was codified in its present location in Title 35 of the Illinois Administrative Code, Section 302.208(e). In its March 7, 1972 Order promulgating the boron General Use water quality standard of 1.0 mg/L, the Board stated:

> Boron. The May 12 and today adopted level of 1.0 mg/L is based on evidence that higher levels can harm irrigated crops. While 100% irrigation is unlikely in Illinois, the uncontrolled discharge of large quantities of boron is clearly undesirable.

The 1.0 mg/L numerical value for the boron General Use water quality standard has not been changed, or directly and technically examined, since the Board's adoption of that value in 1972.[4] A limited number of other states have water quality standards for boron.[5]

The boron concentration in the Galva discharge was first discovered when Larry Lawson, Plant Operator of the Southwest STP, conducted boron sampling between September 2004 and December 2006 at Mud Creek. Mr. Lawson's sampling revealed that during this time-period there was a maximum boron concentration of 3.0 mg/L at any one time, but that the average concentration of boron between September 2004 and December 2006 was 1.13 mg/L. A chart, depicting Mr. Lawson's sampling results, is attached hereto as Exhibit F[6].

Subsequent to these results, the IEPA established the Galva Sanitary System NPDES permit condition requiring compliance with an effluent standard of 1mg/l. That permit condition applies to the Southwest STP and is contained in NPDES Permit No. IL0023647.

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[4] The Board has, however, granted Adjusted Standards and adopted Site Specific rules which make adjustments to this standard. See pages 23 through 25.

[5] Of Illinois' border States, Indiana, Iowa, Kentucky, and Missouri have no water quality standards for boron whatsoever. Wisconsin has a boron standard of 960 microgram/L, but only for groundwater.

[6] The sampling figures detailed in Exhibit F were affected by the amount of rainfall received over time. In times of great precipitation, low boron levels were found since there was a great amount of rainfall infiltration into the sewage collection system. In times of low precipitation, lower water flows in the sewage treatment plants produced a higher boron concentration. Essentially, the boron concentration became more or less diluted, based on the amount of rainfall.

Discharges emitted from the Northeast STP are covered by a different permit, NPDES Permit No.IL0026344. A copy of NPDES Permit No.IL0026344 is attached hereto and incorporated herein as Exhibit G. The terms of NPDES Permit No.IL0026344 do not at this time require Galva to comply with sampling or effluent limits for boron. Nonetheless, boron levels similar to those traced to the discharge from the Southwest STP were also discovered from the Northeast STP. Moreover, testing conducted July 2005 reveals a correlation between discharges from the Northeast STP and the Southeast STP. Accordingly, Galva seeks the same site-specific regulation for both treatment plants.

E. Nature of Receiving Water

As stated previously, the Southwest STP discharges into Mud Creek, a tributary of Walnut Creek, which is a tributary of the Spoon River. Neither Mud Run nor Walnut Creek are large enough to produce enough potable water to sustain a community's drinking water needs. Further, neither Mud Run nor Walnut Creek was assessed in the 2006 of the IEPA's *Integrated Water Quality Report and Section 303(d) List (2006).*

The Northeast STP discharges into an unnamed tributary of the South Branch of the Edwards River. The South Branch of the Edwards River was rated as "fully supporting" of aquatic life and "fully supporting" of fish consumption by the IEPA's *Integrated Water Quality Report and Section 303(d) List (2006).* The IEPA's report also noted that the South Branch of the Edwards River was "not supporting" of primary contact use, based on fecal coli form bacteria data obtained on the water. The source of the coli form bacteria is unknown. In addition, the South Branch of the Edwards River is not a viable source for potable water for any of the surrounding communities.

A map of the affected waterways is attached hereto and incorporated herein as Exhibit H.

As indicated above by Mr. Lawson's sampling, Galva is seeking a site-specific regulation allowing discharge of effluent from its sewage treatment plants with a concentration of up to 3 mg/L of boron. Stream flow data was collected for the affected waterways, using the 7 Day 10 Year Low Flow Map (7Q10 Map) for the Spoon River Region, published by the Illinois State Water Survey (ISWS), and the Illinois Streamflow Assessment Model available online form the ISWS. The low flow stream discharges were assessed at the 7 Day 10 Year low flow event (7Q10).

When utilizing the minimum average monthly discharge data from Galva's sewage treatment plants from 2006 (See Exhibit F), and assuming that the maximum recorded boron concentration was to occur during a low flow period, the extent of the necessary relief from the boron standard was calculated using the below-mentioned equation for each of the sewage treatment plants. After applying the appropriate data in the equation, the results reflect the total amount of distance necessary for boron to be diluted to the present standard of 1.0 mg/L.

$$C_{BORON\ ADDED} = [Q_{STP} \times C_{STP}] / [Q_{STP} + Q_{STREAM}]$$

Where:

$C_{BORON\ ADDED}$	=	Final boron concentration in receiving stream (mg/L)
Q_{STP}	=	Discharge from sewage treatment plant (cfs)
Q_{STP}	=	Boron concentration in STP discharge (mg/L)
Q_{STREAM}	=	Water flow in stream during Q710 conditions (cfs)

As for the Northeast STP, the lowest average monthly discharge for 2006 was 0.37 cfs, occurring in the month of July 2006 (See Exhibit F). During low flow periods (7Q10), the discharge from the Northeast STP would receive adequate dilution at the point where the South Branch of the Edwards River discharges and mixes with the Edwards River. At this point, the boron concentration in the stream dropped below 1.0 mg/L during 7Q10 conditions.

$$C_{BORON\ ADDED} = [Q_{STP} \times C_{STP}] / [Q_{STP} + Q_{STREAM}]$$

$C_{BORON\ ADDED}$ = [0.37 cfs X 3.0 mg/L / [0.93 cfs]

$C_{BORON\ ADDED}$ = 0.94 mg/L

As a result of the above calculation, dilution would occur approximately 16.1 miles downstream from the outfall of the Northeast STP. Despite the foregoing, it should be noted that this is considering a worst case scenario; during normal stream flow conditions, dilution would occur much closer to the discharge of the Northeast STP. A map depicting the point of dilution for the Northeast STP is attached hereto and incorporated herein as Exhibit I.

As for the Southwest STP, the lowest average monthly discharge for 2006 was 0.015 cfs, occurring in the month of November 2006 (See Exhibit F). During low flow periods (7Q10), the effluent from the Southwest STP would receive adequate dilution at the point just past where Mud Run discharges into Walnut Creek. Again, it should be noted that this is a worst case scenario, because during normal conditions dilution would occur much closer to the discharge point of the Southwest STP.

$C_{BORON\ ADDED}$ = $[Q_{STP} \times C_{STP}] / [Q_{STP} + Q_{STREAM}]$

$C_{BORON\ ADDED}$ = [0.015 cfs X 3.0 mg/L / [0.20 cfs]

$C_{BORON\ ADDED}$ = 0.225 mg/L

As a result of the above calculation, dilution would occur approximately 7 miles from the outfall of the Southwest STP. A map depicting the point of dilution of the Southwest STP is attached hereto and incorporated herein as Exhibit I. In addition, detailed mass balance calculations for each of the sewage treatment plants is attached hereto and incorporated herein as Exhibit J.

E. Affected Sources and Facilities

The landowners neighboring the waterways at issue typically use the waterways only for drainage purposes. The concerns which led to the Board's establishment of the boron water quality standards are not applicable here. Research conducted by Galva's engineers, Bruner, Cooper & Zuck, Inc., indicated that not one of the 22 nurseries located in Henry and Knox counties utilize the receiving waters at issue for irrigation purposes, and that there are not any golf courses located directly along the waterways. Further, Katie Boruff, the Henry County Farm Bureau Director, and Josh Gibb, the Knox County Farm Bureau Director, confirmed that they were unaware of any specialty crops being grown along the waterways requiring constant irrigation. In addition to the foregoing, Gary Clark, Director of the Office of Natural Resources at the Illinois Department of Natural Resources, indicated that no authorized permits for structures existed to draw water from the streams.

As stated previously, the affected waterways are generally used for nothing other than drainage purposes. The lack of use of the waterways, low flow, and adequate current use of receiving waters at issue, considering the current boron levels, demonstrates that the granting of this petition will not adversely affect the use of the affected waterways or the environment.

F. Available Treatment and/or Control Options

Galva has explored numerous options for controlling the boron concentration in its effluent, including boron removal techniques and obtaining alternative sources of water. This section identifies those options. The next section evaluates them.

Galva has considered utilizing ion exchange and potable water reverse osmosis for removing boron from the water. In addition, Galva has considered obtaining alternative sources of water by (1) drilling a new well, (2) obtaining water from the City of Kewanee, and (3)

obtaining water from the City of Galesburg, which would thereby eliminate the boron concentrated water from flowing into Galva's sewage treatment plants.

i. Ion Exchange

Galva has explored the option of removing excess boron from its water supply at the two sewage treatment plants by utilizing ion exchange. Ion exchange is the process of removing ions from water, accomplished by exchanging selected ions with other ions attached to an exchange media or resin. In this scenario, boron ions would be replaced by the resin as it passed through an exchange media. When the supply of resin becomes saturated with water, the exchange media is backwashed, regenerated with a solution of acid, and rinsed. A properly operated Ion Exchange Plant will reduce the boron levels in the feed water by approximately 90%.

ii. Potable Water Ion Exchange Process

As Galva's municipal water supply contains boron, and directly feeds into the two sewage treatment plants, Galva has also considered the option of removing excess boron from its potable water supply, prior to the water being sent to the distribution system and to the sewage treatment plants. The ion exchange process for the potable water supply would be the same as is discussed in the previous section.

iii. Potable Water Reverse Osmosis Process

Galva has explored the option of removing excess boron from its potable water supply by using reverse osmosis ("RO"). Again, this method would be used to eliminate excess boron prior to the water entering the sewage treatment plants. Although RO has been successfully used to remove boron from water, it is not as common of an application as ion removal. RO utilizes a semi-permeable membrane which allows water permeation, but acts as a highly selective barrier. The highly selective barrier separates inorganic and microbial species in the water. In RO, the

application of external pressure difference to solution causes water to flow against the natural direction in the membrane, producing water more pure than the original solution. At the conclusion of this process, it is estimated that utilizing RO would reduce boron levels by approximately 55%-60%.

iv. Drill a New Well

It is clear that if Galva were to find a sustainable alternate source of water, free of boron, the boron discharge problem could be avoided. As is true with Galva, most neighboring communities supply water to their residents with water obtained from deep wells. Further, the water supplied in neighboring communities is obtained from the same or similar geological formations as Well No. 4 and Well No. 5 in Galva. If Galva were to commence drilling for new water, boron free water would most likely be located in shallow wells located in sand and gravel deposits, below the Earth's surface.

v. City of Kewanee

Another alternative source of boron free water which Galva has explored is to obtain water from the City of Kewanee, located approximately 12 miles northeast of Galva.

vi. City of Galesburg

A final alternative for boron free water exists in the City of Galesburg, located approximately 22 miles southwest of Galva.

G. Technical Feasibility and Economic Reasonableness

i. Ion Exchange

In a typical ion exchange scenario, after the exchange media is backwashed, regenerated with a solution of acid, and rinsed, the wastewater is discharged to drain after the Ph is adjusted. However, in this situation, the resulting boron concentration of the wastewater would not make

this option possible. After the regeneration cycle, the wastewater would have a boron concentration of approximately 3100 mg/L. In the event the wastewater from the backwash and rinse cycles is diluted, the wastewater would still have a boron concentration of 375 mg/L.

Considering the above-mentioned discussion on high boron concentration, if an ion exchange unit were placed at each of the two sewage treatment plants and treated 50% of the effluent, approximately 5,000 gallons of wastewater would be produced at each STP every 8-9 days. In effect, 5,000 gallons of wastewater containing high concentrations of boron would have to be disposed of every 4-5 days.

When disposing of the highly boron concentrated wastewater, two methods of disposal are available. First, the wastewater could be pumped or trucked to a large sewage treatment plant which discharges into a major river. Geographically, in this scenario, the only available options would be large sewage treatment plants located in either the Quad Cities or Peoria. However, both of these locations are roughly 50 miles away from Galva.

A second option is for an evaporation pond to be used for the wastewater. Although this method is potentially feasible in Galva's circumstance, numerous projects specifics would need to be known before making a proper judgment on whether evaporation ponds would be effective. Moreover, it must be considered that with the exception of relatively small amounts of wastewater, evaporation ponds typically are not very effective in the central Illinois climate.

Nonetheless, Galva has evaluated the estimated costs associated with constructing ion exchange facilities at the two STPs. The chart does not include ongoing operation and maintenance costs.

Construction Items	Cost
Ion Exchange Equipment	$420,000
Backwash Storage Tank	$78,750
Building	$105,000

Plant Piping	$52,500
Electrical	$78,750
HVAC	$21,000
Site Work	$10,500
Miscellaneous	$15,750
Subtotal	$782,250
10% Contingency	$78,225
Subtotal Construction	$860,475
x 2 Plants	$1,720,950
Non-Construction Items	
Design Engineering	$177,450
Construction Engineering	$100,800
Legal Fees	$17,210
Subtotal Non-Construction Items	$295,460
(Engineering Fees based on Rural Development Fee Schedule and Legal Fees based on 1% of Construction)	
Total Estimated Cost:	**$2,016,410**

Although utilizing an ion exchange process is effective in removing excess boron from water, the process creates an inordinate amount of wastewater with highly concentrated boron. On top of being responsible for over $2,000,000 in initial construction costs, Galva would be responsible for disposing of 5,000 gallons of wastewater at an offsite location every 4-5 days. Regardless of whether this wastewater is piped or trucked to a location 50 miles away, or transported to an evaporation pond, high maintenance and day-to-day operation costs would drive up the financial burden on the citizens of Galva. When considering the technical and economic burdens associated with utilizing ion exchange, and the absence of a negative impact from adopting the proposed site-specific rule, it is clear that ion exchange is neither technically feasible nor economically reasonable.

ii. Potable Water Ion Exchange Process

Unlike treatment of the wastewater at the STPs by ion exchange, in this scenario, the ion treatment process would be required to take place on the potable water supply on a daily basis. Assuming 50% of the potable water supply would be treated, boron levels would be reduced by

55%-60%. However, it is important to note that every 7-8 days, approximately 5,000 gallons of water would have to be disposed of.

The following chart is an estimate of the construction costs for constructing an ion exchange facility near Well No. 5 for treating the potable water supply by ion exchange. However, it is important to note that the chart does not include ongoing operation and maintenance costs.

Construction Items	Cost
Ion Exchange Equipment	$525,000
Backwash Storage Tank	$105,000
Finish Water Reservoir	$210,000
Building	$136,500
Plant Piping	$63,000
Electrical	$105,000
HVAC	$31,500
Site Work	$21,000
Raw/Finish Water Mains (± 4000' each)	$420,000
Miscellaneous	$31,500
Subtotal	$1,648,500
10% Contingency	$164,850
Subtotal Construction	$1,813,350
Non-Construction Items	
Design Engineering	$163,800
Construction Engineering	$94,500
Legal Fees	$18,134
Permit Fees (B.N.S.F.)	$10,000
Subtotal Non-Construction Items	$286,434
(Engineering Fees based on Rural Development Fee Schedule and Legal Fees based on 1% of Construction)	
Total Estimated Cost:	**$2,099,784**

As stated in the previous section, although utilizing an ion exchange process is effective in removing excess boron from water, the process creates an inordinate amount of highly boron concentrated wastewater. Galva would be responsible for disposing of 5,000 gallons of wastewater at an offsite location every 4-5 days and over 2,000,000 in initial construction costs. Regardless of whether this wastewater is piped or trucked to a location 50 miles away, or

transported to an evaporation pond, high maintenance and day-to-day operation costs would drive up the financial burden on the citizens of Galva. When considering the technical and economic burdens associated with utilizing ion exchange, and the absence of a negative impact from adopting the proposed site-specific rule, it is clear that ion exchange is not technically nor economically reasonable.

iii. Potable Water Reverse Osmosis Process

A typical RO procedure results in 75% of the water permeated being recovered, and 25% of the concentrate being sent to waste. However, after the necessary pre and post cycle flushes are used to rinse the membranes, about 1/3 of the water would actually have to be sent to waste. As a result, assuming 50% of water is treated to reduce the concentration of boron, approximately 100,000 gallons of wastewater would be produced each day.

The production of 100,000 gallons of wastewater per day creates too large of a burden to consider off-site disposal at a larger facility or evaporation ponds. As a result, the only other available option for the disposal of the wastewater would be to drill a deep well injection. A deep well injection's typical application is for RO waste resulting from seawater treatment plants. Deep well injection construction costs are extremely high, and are typically only used in seawater treatment plants because the options for treating water in this scenario is so limited that the cost is justified.

The following chart is an estimate of the construction costs for constructing a RO treatment facility near Well No. 5. The chart does not include operation and maintenance costs.

Construction Items	Cost
Reverse Osmosis Equipment	$1,050,000
Concentrate Storage Tank	$420,000
Deep Well & Injection System	$3,150,000
Replace Well Pumps	$78,750
Building	$157,500

Plant Piping	$78,750
Electrical	$105,000
HVAC	$31,500
Site Work	$26,250
Raw/Finish Water Mains (+ 4000' each)	$420,000
Miscellaneous	$105,000
Subtotal	$5,622,750
10% Contingency	$562,275
Subtotal Construction	6,185,025
Non-Construction Items	
Design Engineering	$467,250
Construction Engineering	$266,700
Legal Fees	$61,005
Permit Fees (B.N.S.F.)	$10,500
Subtotal Non-Construction Items	$805,455
(Engineering Fees based on Rural Development Fee Schedule and Legal Fees based on 1% of Construction)	
Total Estimated Cost:	**$6,905,955**

RO is not a technically feasible or financially reasonable option for Galva to undertake in addressing boron levels in the water it discharges from the sewage treatment plant. As the above discussion demonstrates, utilizing RO would only eliminate 2/3 of boron from processed water. Moreover, approximately 100,000 gallons of highly boron concentrated wastewater would be produced each day, requiring disposal. As disposing of this large amount of wastewater would not be technically feasible to dispose offsite, Galva citizens would be forced to incur the substantial costs associated with drilling a deep well injection and disposing of the wastewater in a deep well. As this process would cost citizens of the City of Galva nearly $7,000,000, when considering the neutral effect this proposed site-specific rule would have on the environment, it is clear that the cost of RO is financially unreasonable.

iv. Drill a New Well

A search of the Illinois State Water Survey's Private Well Database indicates that there are very few private shallow wells near Galva. The nearest location for a new well, which would

not have the boron issues associated with the deep wells surrounding Galva, would be in the far northeastern portion of Henry County near the Green River, approximately 20 to 25 miles from Galva.[7] A map detailing the location of this alternative water source is attached hereto and incorporated herein as Exhibit K.

If Galva were to pursue a drilling project for water, a test-drilling program would be required to establish whether an adequate supply of water is actually present. After the test drilling, Galva would have to address issues regarding pumping facilities, pipelines, etc. Although it is difficult to determine the up-front costs on drilling for water, as it depends on the extent, cost, and success of the drilling project, Galva has received an estimate from a well driller that it would cost at least $100,000 for the initial drilling project. The uncertainties in this scenario regarding the success and cost of a drilling project, and the cost associated with constructing a 20-25 mile pipeline, along with the minimal benefit (if any) which would result from a new well, render this option economically unreasonable.

v. City of Kewanee

After inquiry was made by Galva to the City of Kewanee regarding the possibility of obtaining water, the City of Kewanee responded that it would not be feasible, as the amount of water needed by Galva in the future may be too great for its capacity. A map detailing the location of this alternative water source is attached hereto and incorporated herein as Exhibit K.

vi. City of Galesburg

Galva has had discussions with officials from the City of Galesburg regarding obtaining water service from Galesburg, all of which have been positive. A map detailing the location of this alternative water source is attached hereto and incorporated herein as Exhibit K. Although the estimated cost of a pipeline from the City of Galesburg to Galva is difficult to estimate,

[7] "Groundwater Geology in Western Illinois, North Part", Illinois State Geological Survey, Circ. 222 (1956).

considering the potential participation of other municipalities along the route, the City of Galesburg presented a report to Galva discussing technical issues and estimated costs. A copy of this report is attached hereto and incorporated herein as Exhibit L. According to the report, the City of Galva would be responsible for approximately $13.6 million of the total estimated project cost of $16.1 million; however, this estimate does not include operation and maintenance costs.

It is important to note that Galva's discussion with officials from the City of Galesburg and the City of Kewanee regarding water service were initially instigated for issues independent of high boron levels. Galva had discussions with Prairie Ethanol, LLC regarding the prospect of constructing an ethanol plant in Galva. A feasibility study was conducted by BMI International Consulting, which concluded that Galva is an excellent site for a new ethanol plant. Ethanol plants require an extremely high volume of water for extended periods of time. BMI International Consulting's study concluded that providing water service to an ethanol plant via water wells proved to be too high of a burden on the current wells drilled in and around Galva. As a result, if new wells were drilled in or around Galva, they would likely yield highly boron-concentrated water, and thus a sophisticated water treatment plant would be necessary, in addition to the well, in order to meet specific TDS water requirements. TDS water requirements are strict content requirements for water entering ethanol plants. As a result of the foregoing, in the event an ethanol plant is constructed in Galva, a sufficient boron-free water source, i.e. the City of Galesburg or the City of Kewanee, would be necessary in order to provide a sufficient water supply, with minimal boron concentration.

As noted previously, the distance between Galva and the City of Galesburg is approximately 22 miles. In order to connect a water pipeline between the two cities, two alternatives routes exist. The most direct route involves a connection at Hawthorne Centre,

followed by a cross-county alignment for 2.5 miles in a north and east direction to an intersection with U.S. Route 34, approximately ¾ of a mile northeast of the U.S. 34/I-74 Interchange. At this point, the alignment parallels U.S. Route 34 and the B.N.S.F. Railway through the Village of Wataga, the City of Oneida, and the Village of Altona, where U.S. Route 34 diverges from the Railroad. From this point, the alignment continues in a northeast direction, parallel with the B.N.S.F. Railway until the south side of Galva is reached. At this point, the water transmission main would turn east, cross the south side of Galva, and ultimately terminate at Galva's Southeast Water Treatment Plant. The total length of this completed route is 23.33 miles, and is accurately depicted on Appendix F to Exhibit L.

An alternate route is also accurately depicted on Appendix F to Exhibit L. The alternate route is similar, except that Connection Point "B" is utilized. At this point, the pipe is connected to an existing 16" water main on Carl Sandburg Drive, then proceeds northerly along Henderson Street to North Lake Storey Road. From this point, the water transmission main would turn east and connect to the previously described alignment approximately ½ mile west of Interstate 74. This alternate route requires a longer total transmission main distance, totaling 24.87 miles.

Whether the first or second alternative for obtaining water from the City of Galesburg is chosen, several costly and time-consuming issues arise. In laying the pipe from the City of Galesburg to Galva, easements must be acquired over private property, and permits and license agreements must be obtained from the Illinois Department of Transportation, the Burlington Northern Santa Fe Railway, the Illinois Environmental Protection Agency, and the Knox and Henry County Highway Departments. In addition, authorizations must be obtained from the Illinois Department of Agriculture, the Illinois Department of Natural Resources, and the State Historic Preservation Office. It is estimated that obtaining all necessary easements, permits and

authorizations would be costly and take approximately one year. In addition, as noted above, the cost to Galva would be an upfront cost of roughly $13.6 million. The $13.6 million cost associated with obtaining water is nearly double the cost of each of the above-mentioned alternatives. Given these costs, necessary time for completion, operating costs and fees, as well as the minimal benefit (if any) which would result, this alternative is unreasonable.

H. Economic Impact of Proposed Rule

If Galva is required to comply with General Use water quality standard for boron of 1.0 mg/L, it will be required to take costly measures to eliminate excess boron from its effluent. The options available to Galva, and their associated upfront costs, can be summarized as follows:

a. Ion Exchange - $2,016,410
b. Potable Water Ion Exchange - $2,099,784
c. Potable Water Reverse Osmosis - $6,905,955
d. Drill New Well – Initial search $100,000, not including actually drilling.
e. City of Kewanee – Not possible.
f. City of Galesburg - $13,600,000.

In addition to these staggering upfront costs, Galva would be responsible for signification maintenance and operational costs. As many of these options include complex offsite disposal issues, significant day-to-day costs will be incurred in disposing of wastewater at offsite locations. These costs combined with the upfront construction, design, and legal costs make these options impractical without significant financial assistance. Official from Galva have visited both Springfield and Washington, DC in search of grant funds to address the boron issue, but were advised that funds were tight and/or previously earmarked for other purposes.

The options available for building large-scale pipeline systems for an alternative potable water supply are expensive, and the water supply sources are a considerable distance form Galva. The City of Kewanee option is not available and the City of Galesburg option has numerous

technical and political issues which still need to be resolved. Finally, the drilling option involves an expensive operation to develop wells and to construct an adequate pipeline.

Galva is a small rural community in Henry County, without the resources necessary to deal with the costs associated with compliance with the IEPA's application of a 1.0 mg/L effluent standard for boron discharges from its sewage treatment plants. As the site-specific rule proposed in this petition would produce no foreseeable negative implications on the environment, application of a 1.0 mg/L effluent standard for boron is neither environmentally nor economically reasonable. If Galva were forced to pursue one of the above-mentioned options without any assistance, the user rates for the citizens of Galva would likely rise to a record state level. Given the lack of environmental necessity for the application of this standard to these treatment plants (see below), government assistance is itself unlikely.

I. Environmental Impact of Proposed Rule

Compliance with the General Use water quality standard for boron is not necessary here since the basis for the establishment of the water quality standard (irrigation of crops) is not an issue. Clearly it is neither reasonable nor necessary to apply the boron water quality standard as an effluent standard in this instance.

The proposed rule would simply establish a reasonable effluent standard for boron, which reflects the naturally occurring boron relevant to the Galva environs, which both sustains the Galva citizens as their source of drinking water and which is ultimately disposed of in the Galva sewage treatment plants. Quite simply, there is no foreseeable environmental impact incurred by the adoption of this rule.

The site-specific rule proposed by this petition is consistent with other relief granted by the Board concerning the boron water quality standard. In a 1995 Adjusted Standard proceeding,

the Board allowed Illinois Power Company ("Illinois Power") to discharge water with a boron effluent concentration of 9.9 mg/L. See *In the Matter of: Petition of Illinois Power Company (Baldwin Power Plant) for Adjusted Standard from 35 Ill. Adm. Code 302.208 and 35 Ill. Adm. Code 304.105*, AS 96-1 (1995) In that case, the Board fully examined the environmental impact of boron, and concluded that the higher boron concentration would not adversely affect the Kaskaskia River ecosystem.

Similarly, the Board allowed Illinois Power to discharge water with a boron effluent concentration of 4.5 mg/L at its Duck Creek Station. See *In the Matter of: Petition of Illinois Power Company (Duck Creek Station) for Adjusted Standard from 35 Ill. Adm. Code 302.208 and 35 Ill. Adm. Code 304.105*, AS 96-8 (1995). Again, Illinois Power provided great technical detail concerning the environmental effect of high boron concentrations in water and, as a consequence, the Board granted an adjusted standard which allowed Illinois Power Company to discharge boron with a concentration of 4.5 mg/L.

As a final example, the Board has twice (in 1994 and again in 2007) granted adjusted standards for the City of Springfield to discharge boron at a concentration much higher than the 1/0 mg/L water quality standard. See *In the Matter of: Petition of the City of Springfield, Office of Public Utilities for an Adjusted Standard from 35 Ill. Adm. Code 302.208(e)*, AS 94-9 (1994) and [CITE]. These Board orders allow the City of Springfield municipally-owned utility, City Water Light and Power ("CWLP") to discharge waste water with a boron concentration of 11/0 mg/L directly into the Sangamon River.

As is evident from the above discussion, relief previously granted by the Board for discharges with concentrations of 11.0 mg/L, 9.9 mg/L, and 4.5 mg/L demonstrates that a boron water quality standard of 3.0 mg/L, as proposed in this petition, is not unreasonable. If the Board

grants the site-specific rule requested by Galva in this Petition, no change will be made from present operations at the Northeast STP and the Southwest STP, and as a result, no change in the present water quality will occur. As there are not any current environmental issues resulting from the boron concentration in the water, no adverse environmental impacts are expected to occur under the new standard nor would be expected to occur in the future.

J. Compliance with the Proposed Adjusted Water Quality Standard

As stated above, the granting of the proposed site-specific rule for boron will not result in any change from the present operating conditions of the Northeast STP or the Southwest STP. Since present discharges have not had an adverse impact on the receiving waters at issue, conforming current discharges to the proposed site specific standard should also not have an adverse impact on the water.

Present and potential future issues simply would also not be adversely affected by the proposed adjusted water quality standard. The current and proposed concentrations of the boron adjusted water quality standard will have no affect on navigational and industrial uses, and will not affect aquatic life and wildlife. Even if the receiving waters were to be used for crop irrigation in the future, adverse impacts are unlikely. Given that boron toxicity develops only after long term use of highly boron concentrated irrigation water, and that the need for irrigation would be infrequent along these receiving waters, any future irrigation withdraws from the receiving waters are unlikely to have an adverse impact on irrigated crops due to the low concentration of boron in the water.

IV. MOTION FOR WAIVER OF SIGNATURE REQUIREMENT

In a separate Motion filed simultaneous with this Petition, Galva respectfully requests that the Board waive the requirement, set forth at 35 Ill. Admin. Code 102.202(f), that a petition for rulemaking be signed by at least 200 persons.

V. STATEMENT OF RECENCY

The rules proposed in this Petition do not amend any existing rules. Instead, this rulemaking would establish a new rule, a specific boron effluent standard applicable to the Galva's discharge pursuant to its sewage treatment plants. The new site-specific regulation proposed to be added to Part 304 would amend the most recent version of Part 304 published on the Board's Web Site, which was last amended in R04-26 at 30 Ill. Reg. 2365, effective February 2, 2007. It would be applicable only to the Galva circumstances relayed in this Petition.

VI. ATTACHMENTS

The following attachments are included by Galva in support of the site-specific effluent standard proposed, and are hereby made a part of this petition:

A. NPDES Permit No. IL 0023647 ("Exhibit A");
B. Map of the City of Galva ("Exhibit B");
C. Schematic of Southwest STP ("Exhibit C");
D. Discharge Flow Chart ("Exhibit D");
E. Schematic of Northeast STP ("Exhibit E");
F. Chart of Larry Lawson's Sampling Results ("Exhibit F");
G. NPDES Permit No. IL 0026344 ("Exhibit G");
H. Map of Affected Waterways ("Exhibit H");
I. Dilution Map for the Sewage Treatment Plants ("Exhibit I");
J. Mass Balance Calculations for Sewage Treatment Plants ("Exhibit J");
K. Alternative Water Source Map ("Exhibit K");
L. Galesburg Water Pipeline Report ("Exhibit L").

VII. CONSISTENT WITH FEDERAL LAW

The Board, consistent with federal law, has the ability to grant the proposed site specific rule. Pursuant to Section 303 of the Clean Water Act (33 U.S.C. 1313) states are granted the

authority to promulgate water quality standards applicable to both interstate and intrastate waters, subject to USEPA approval. The water quality standard at issue in this petition, the General Use water quality standard for boron, is found in Board rules developed pursuant to the Board's statutory authority to develop rules consistent with the federal Clean Water Act.

Pursuant to regulations promulgated by the U.S. EPA to implement Section 303 of the Clean Water Act, States also have the authority to revise water quality standards and to include in their State standards policies generally affecting the application and implementation of the standards, such as mixing zones, low flows and variances. 40 C.F.R. 131.4 and 131.13. Another example of these general policies is the Board's procedure for obtaining adjusted standards, set forth at 35 Ill. Admin. Code Part 106, Subpart G.[8] Thus, by following its adjusted standard procedure with respect to the Board's own federally authorized and approved General Use water quality standards, the Board is exercising the authority granted to the States in Section 303 of the Clean Water Act.

VIII. RELIEF REQUESTED

Galva respectfully requests that the Board grant the site-specific relief requested herein or whatever other relief the Board deems appropriate.

As demonstrated above, treatment to a General Use boron water quality standard and effluent standard of 1.0 mg/L is neither technically feasible nor economically reasonable for this site. Moreover, compliance with the 1.0 mg/L standard would require Galva to incur great expense to either treat excess boron or to obtain an alternative water source. This great expense would have a severe negative economic impact on Galva, and potentially the State. Such

[8] Galva pursues this regulatory relief as a Site Specific rule, instead of an Adjusted Standard, at the urging of the IEPA. Moreover, the rule sets forth an effluent standard, as opposed to an adjustment of a water quality standard as prior Board cases have appeared to determine that relief from Part 304 of the Board's regulations was more appropriate than relief from Part 302. See *In the Matter of Rhodia, Inc., et. at.*, AS 01-9, slip op. at 10 (Ill. PCB, January 10, 2002.)

expense is not reasonable, because there is no environmental benefit to be gained from compliance. A site-specific effluent standard of 3.0 mg/L of boron will not harm the aquatic life in the receiving streams to which Galva discharges, nor will it have an adverse impact on the environment generally.

Rather, the circumstances before the Board in this matter suggest that an application of the boron water quality standard, developed in 1972, as an effluent standard for boron discharged from a water treatment plant owned by a small town whose water supply itself safely contains a boron concentration higher than what the IEPA will allow for discharge is simply untenable. An application of the boron water quality regulation as an effluent standard for the NPDES is neither reasonable nor necessary. The Board has great authority to protect the environment, and is called upon to do so in a manner which takes into consideration a variety of factors, such as the existing physical conditions, the character of the area involved, including the character of surrounding land uses, zoning classifications, the nature of the existing air quality, or receiving body of water, as the case may be, and the technical feasibility and economic reasonableness of measuring or reducing the particular type of pollution. Moreover, the generality of this authority is only limited by the specifications of particular classes of regulations in the Illinois Environmental Protection Act. Galva urges that an application of those factors will justify the relief requested herein, or any other relief the Board deems appropriate.

WHEREFORE, for the above and foregoing reasons, the Petitioners, CITY OF GALVA, respectfully requests that the Illinois Pollution Control Board promulgate the site-specific effluent standard for boron requested, and/or grand such other relief as is just and appropriate.

Respectfully submitted:

CITY OF GALVA
Petitioner,

By: _____
Claire A. Manning

Dated: September _____, 2007

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